



```
[21]: import pandas as pd
import numpy as np
%matplotlib inline
import matplotlib.pyplot as plt
import seaborn as sns
import re
import nltk
import string
from sklearn.model_selection import train_test_split
from sklearn.cluster import KMeans
from sklearn.metrics import silhouette_score
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.stem.porter import PorterStemmer
from nltk.stem.wordnet import WordNetLemmatizer
from sklearn.feature_extraction.text import CountVectorizer, TfidfVectorizer
from sklearn.naive_bayes import MultinomialNB
from sklearn.svm import SVC
from sklearn.metrics import classification_report, accuracy_score
from sklearn.preprocessing import LabelEncoder
```

```
[23]: import warnings
warnings.filterwarnings("ignore")
```

[35]: `print(df.describe())`

	Comment	Emotion
count	5937	5937
unique	5934	3
top	i feel like a tortured artist when i talk to her	anger
freq	2	2000

[37]: `df.isnull().sum()`

[37]: Comment 0
Emotion 0
dtype: int64

[39]:

Comment 0
Emotion 0
dtype: int64

[41]: `comment = df["Comment"]`
`emotions = df["Emotion"]`
`print(comment)`
`print(emotions)`

0 i seriously hate one subject to death but now ...
1 im so full of life i feel appalled
2 i sit here to write i start to dig out my feel...
3 ive been really angry with r and i feel like a...
4 i feel suspicious if there is no one outside l...
...

5932 i begun to feel distressed for you
5933 i left feeling annoyed and angry thinking that...
5934 i were to ever get married i d have everything...
5935 i feel reluctant in applying there because i w...
5936 i just wanted to apologize to you because i fe...

Name: Comment, Length: 5937, dtype: object

0 fear
1 anger
2 fear
3 joy
4 fear
...

['i seriously hate one subject to death but now i feel reluctant to drop it', 'im so full of life i feel appalled', 'i sit here to write i start to dig out my feelings and i think that i am afraid to accept the possibility that he might not make it', 'ive been really angry with r and i feel like an idiot for trusting him in the first place', 'i feel suspicious if there is no one outside like the rapture has happened or something', 'i feel jealous because i wanted that kind of love the true connection between two souls and i wanted that', 'when a friend of mine keeps telling me morbid things that happened to his dog', 'i finally fell asleep feeling angry useless and still full of anxiety', 'i feel a bit annoyed and antsy in a good way', 'i feel like i ve regained another vital part of my life which is living', 'i feel a bit like franz liebkind in the producers not many people know it but that he fuhrer was a terrific dancer', 'i was feeling at the start didnt want to move much at all was really glad to experience this glimpse into the sort of vibrant energy i will gain through out the year', 'i was bitten by a dog', 'i do not always find myself feeling thankful but over the years i ve gathered a few tricks that allow me to feel grateful in the face of moments when the last thing i want to do is say thanks', 'i just try not to talk to anyone when i feel irritable like that', 'i feel like they hated me since then', 'i dont know who wrote the following little note but this is how i feel today if u r offended by the following posting then you obviously have not lived long enough to be compromised on how you act or believe', 'i feel offended i choose to tell you guys how i feel because i treated you guys as friends and would want to put a stop to all these nonsense', 'i remember feeling as if i didnt belong and that i wasn t smart enough cool enough or even young enough', 'i feel like i have to redeem myself even though i think they realized why i was distraught and were ok with it', 'i hope that the next quote will be able to let my special someone know what im feeling i am secure about and understand that no matter how much i trust', 'i feel much better and without the help of ice', 'i am sitting here typing this and wondering where i belong feeling distracted feeling comfortable feeling misunderstood and hurt', 'i still feel its a little shaky at times and can move into the slightly odd jades hair in particular seems prone to this but generally it works well with spencers writing', 'i stopped about for a bit feeling grumpy because i was missing out', 'i have a feeling i shall go mad', 'i am happy when i get good results in the field of academics or athletic

[45]: !pip install nltk

[47]: df



[47]:

Comment **Emotion**

0	i seriously hate one subject to death but now ...	fear
1	im so full of life i feel appalled	anger
2	i sit here to write i start to dig out my feel...	fear
3	ive been really angry with r and i feel like a...	joy
4	i feel suspicious if there is no one outside l...	fear
...
5932	i begun to feel distressed for you	fear
5933	i left feeling annoyed and angry thinking that...	anger
5934	i were to ever get married i d have everything...	joy
5935	i feel reluctant in applying there because i w...	fear
5936	i just wanted to apologize to you because i fe...	anger

5937 rows × 2 columns


```
[49]: comment = [doc.lower() for doc in comment]
print(comment)
```

'i seriously hate one subject to death but now i feel reluctant to drop it', 'im so full of life i feel appalled', 'i sit here to write i start to dig out my feelings and i think that i am afraid to accept the possibility that he might not make it', 'ive been really angry with r and i feel like an idiot for trusting him in the first place', 'i feel suspicious if there is no one outside like the rapture has happened or something', 'i feel jealous because i wanted that kind of love the true connection between two souls and i wanted that', 'when a friend of mine keeps telling me morbid things that happened to his dog', 'i finally fell asleep feeling angry useless and still full of anxiety', 'i feel a bit annoyed and antsy in a good way', 'i feel like i've regained another vital part of my life which is living', 'i feel a bit like franz liebkind in the producers not many people know it but the fuhrer was a terrific dancer', 'i was feeling at the start didnt want to move much at all was really glad to experience this glimpse into the sort of vibrant energy i will gain through out the year', 'i was bitten by a dog', 'i do not always find myself feeling thankful but over the years i've gathered a few tricks that allow me to feel grateful in the face of moments when the last thing i want to do is say thanks', 'i just try not to talk to anyone when i feel irritable like that', 'i feel like they hated me since then', 'i dont know who wrote the following little note but this is how i feel today if u r offended by the following posting then you obviously have not lived long enough to be compromised on how you act or believe', 'i feel offended i choose to tell you guys how i feel because i treated you guys as friends and would want to put a stop to all these nonsense', 'i remember feeling as if i didn't belong and that i wasn't smart enough cool enough or even young enough', 'i feel like i have to redeem myself even though i think they realized why i was distraught and were ok with it', 'i hope that the next quote will be able to let my special someone know what im feeling in secure about and understand that no matter how much i trust', 'i feel much better and without the help of ice', 'i am sitting here typing this and wondering where i belong feeling distracted feeling comfortable feeling misunderstood and hurt', 'i still feel its a little shaky at times and can move into the slightly odd jades hair in particular seems prone to this but generally it works well with spencers writing', 'i stropped about for a bit feeling grumpy because i was missing out', 'i have a feeling i shall go mad', 'i am happy when i get good results in the field of academics or athletic

```
[51]: tokenized_docs = [word_tokenize(doc) for doc in comment]
print(tokenized_docs)
print("\nSentence tokenization")
from nltk.tokenize import sent_tokenize
sent_token = [sent_tokenize(doc) for doc in raw_docs]
print(sent_token)
```

[[['i', 'seriously', 'hate', 'one', 'subject', 'to', 'death', 'but', 'now', 'i', 'feel', 'reluctant', 'to', 'drop', 'it'], ['im', 'so', 'full', 'of', 'life', 'i', 'feel', 'appalled'], ['i', 'sit', 'here', 'to', 'write', 'i', 'start', 'to', 'dig', 'out', 'my', 'feelings', 'and', 'i', 'think', 'that', 'i', 'am', 'afraid', 'to', 'accept', 'the', 'possibility', 'that', 'he', 'might', 'not', 'make', 'it'], ['ive', 'been', 'really', 'angry', 'with', 'r', 'and', 'i', 'feel', 'like', 'an', 'idiot', 'for', 'trusting', 'him', 'in', 'the', 'first', 'place'], ['i', 'feel', 'suspicious', 'if', 'there', 'is', 'no', 'one', 'outside', 'like', 'the', 'rapture', 'has', 'happened', 'or', 'something'], ['i', 'feel', 'jealous', 'because', 'i', 'wanted', 'that', 'kind', 'of', 'love', 'the', 'true', 'connection', 'between', 'two', 'souls', 'and', 'i', 'wanted', 'that'], ['when', 'a', 'friend', 'of', 'mine', 'keeps', 'telling', 'me', 'morbid', 'things', 'that', 'happened', 'to', 'his', 'dog'], ['i', 'finally', 'fell', 'asleep', 'feeling', 'angry', 'useless', 'and', 'still', 'full', 'of', 'anxiety'], ['i', 'feel', 'a', 'bit', 'annoyed', 'and', 'antsy', 'in', 'a', 'good', 'way'], ['i', 'feel', 'like', 'i', 've', 'regained', 'another', 'vital', 'part', 'of', 'my', 'life', 'which', 'is', 'living'], ['i', 'feel', 'a', 'bit', 'like', 'franz', 'liebkind', 'in', 'the', 'producers', 'not', 'many', 'people', 'know', 'it', 'but', 'the', 'fuhrer', 'was', 'a', 'terrific', 'dancer'], ['i', 'was', 'feeling', 'at', 'the', 'start', 'didnt', 'want', 'to', 'move', 'much', 'at', 'all', 'was', 'really', 'glad', 'to', 'experience', 'this', 'glimpse', 'into', 'the', 'sort', 'of', 'vibrant', 'energy', 'i', 'will', 'gain', 'through', 'out', 'the', 'year'], ['i', 'was', 'bitten', 'by', 'a', 'dog'], ['i', 'do', 'not', 'always', 'find', 'myself', 'feeling', 'thankful', 'but', 'over', 'the', 'years', 'i', 've', 'gathered', 'a', 'few', 'tricks', 'that', 'allow', 'me', 'to', 'feel', 'grateful', 'in', 'the', 'face', 'of', 'moments', 'when', 'the', 'last', 'thing', 'i', 'want', 'to', 'do', 'is', 'say', 'thanks'], ['i', 'just', 'try', 'not', 'to', 'talk', 'to', 'anyone', 'when', 'i', 'feel', 'irritable', 'like', 'that'], ['i', 'feel', 'like', 'they', 'hated', 'me', 'since', 'then'], ['i', 'dont', 'know', 'who', 'wrote', 'the', 'following', 'little', 'note', 'but', 'this', 'is', 'how', 'i', 'feel', 'today', 'if', 'u', 'r', 'offended', 'by', 'the', 'following', 'posting', 'then', 'you', 'obviously', 'have', 'not', 'lived', 'long', 'enough', 'to', 'be', 'compromised', 'on', 'how', 'you', 'act', 'or', 'believe'], ['i', 'feel', 'offended', 'i', 'choose', 'to', 'tell', 'you', 'guys', 'how', 'i', 'feel', 'because', 'i', 'treated', 'you', 'guys', 'as', 'friends', 'and', 'would', 'want', 'to', 'put', 'a', 'stop', 'to', 'all', 'these', 'nonsense'], ['i', 'remember', 'feeling', 'as', 'if', 'i', 'didn', 't', 'belong', 'and', 'that', 'i', 'wasn', 't', 'smart', 'enough', 'cool', 'enough', 'or', 'even', 'young', 'enough'], ['i', 'feel', 'like', 'i', 'have', 'to', 'redeem', 'myself', 'even', 'though', 'i', 'think', 'they', 'realized', 'why', 'i', 'was', 'distraught', 'and', 'were', 'ok', 'with', 'it'], ['i', 'hope', 'that', 'the', 'next', 'quote', 'will', 'be', 'able', 'to', 'let', 'my', 'special', 'someone', 'know', 'what', 'im', 'feeling', 'in', 'secure', 'about', 'and', 'understand', 'that', 'no', 'matter', 'how', 'much', 'i', 'trust'], ['i', 'feel', 'much', 'better', 'and', 'without', 'the', 'help', 'of', 'ice'], ['i', 'am', 'sitting', 'here', 'typing', 'this', 'and', 'wondering', 'where', 'i', 'belong', 'feeling', 'distracted', 'feeling', 'comfortable', 'feeling', 'misunderstood', 'and', 'hurt'], ['i', 'still', 'feel', 'its', 'a', 'little', 'shaky', 'at', 'times', 'and', 'can', 'move', 'into', 'the', 'slightly', 'odd', 'jades', 'hair', 'in', 'particular', 'seems', 'prone', 'to', 'this', 'but', 'generally', 'it', 'works', 'well', 'with', 'spencers', 'writing'], ['i', 'stropped', 'about', 'for', 'a', 'bit', 'feeling', 'grumpy', 'because', 'i', 'was', 'missing', 'out'], ['i', 'have', 'a', 'feeling', 'i', 'shall', 'go', 'mad'], ['i', 'am', 'happy', 'when', 'i', 'get', 'good', 'results', 'in', 'the', 'field', 'of', 'academics', 'or', 'athletic']]]

I , ve , regained , another , vital , part , of , my , life , which , is ,
d', 'in', 'the', 'producers', 'not', 'many', 'people', 'know', 'it', 'but', 'the', 'fuhr
g', 'at', 'the', 'start', 'didnt', 'want', 'to', 'move', 'much', 'at', 'all', 'was', 're
'the', 'sort', 'of', 'vibrant', 'energy', 'i', 'will', 'gain', 'through', 'out', 'the',
'not', 'always', 'find', 'myself', 'feeling', 'thankful', 'but', 'over', 'the', 'years'
'me', 'to', 'feel', 'grateful', 'in', 'the', 'face', 'of', 'moments', 'when', 'the', 'la
['i', 'just', 'try', 'not', 'to', 'talk', 'to', 'anyone', 'when', 'i', 'feel', 'irritab
e', 'since', 'then'], ['i', 'dont', 'know', 'who', 'wrote', 'the', 'following', 'little
f', 'u', 'r', 'offended', 'by', 'the', 'following', 'posting', 'then', 'you', 'obviously
romised', 'on', 'how', 'you', 'act', 'or', 'believe'], ['i', 'feel', 'offended', 'i', 'o

```
[53]: regex = re.compile('%s'%re.escape(string.punctuation))
```

```
tokenized_docs_no_punctuation = []
```

```
for review in tokenized_docs:  
    new_review = []  
    for token in review:  
        new_token = regex.sub(u'', token)  
        if not new_token == u'':
```



```
d', 'in', 'the', 'producers', 'not', 'many', 'people', 'know', 'it', 'but', 'the', 'fuhrer', 'was', 'a', 'terrific', 'dancer'], ['i', 'was', 'feelin
g', 'at', 'the', 'start', 'didnt', 'want', 'to', 'move', 'much', 'at', 'all', 'was', 'really', 'glad', 'to', 'experience', 'this', 'glimpse', 'into',
'the', 'sort', 'of', 'vibrant', 'energy', 'i', 'will', 'gain', 'through', 'out', 'the', 'year'], ['i', 'was', 'bitten', 'by', 'a', 'dog'], ['i', 'do',
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'me', 'to', 'feel', 'grateful', 'in', 'the', 'face', 'of', 'moments', 'when', 'the', 'last', 'thing', 'i', 'want', 'to', 'do', 'is', 'say', 'thanks'],
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e', 'since', 'then'], ['i', 'dont', 'know', 'who', 'wrote', 'the', 'following', 'little', 'note', 'but', 'this', 'is', 'how', 'i', 'feel', 'today', 'i
f', 'u', 'r', 'offended', 'by', 'the', 'following', 'posting', 'then', 'you', 'obviously', 'have', 'not', 'lived', 'long', 'enough', 'to', 'be', 'comp
romised', 'on', 'how', 'you', 'act', 'or', 'believe'], ['i', 'feel', 'offended', 'i', 'choose', 'to', 'tell', 'you', 'guys', 'how', 'i', 'feel', 'beca
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```
[53]: regex = re.compile('%s'%re.escape(string.punctuation))
```

```
tokenized_docs_no_punctuation = []

for review in tokenized_docs:
    new_review = []
    for token in review:
        new_token = regex.sub(u'', token)
        if not new_token == u'':
            new_review.append(new_token)
    tokenized_docs_no_punctuation.append(new_review)
print(tokenized_docs_no_punctuation)
```

```
['i', 'seriously', 'hate', 'one', 'subject', 'to', 'death', 'but', 'now', 'i', 'feel', 'reluctant', 'to', 'drop', 'it'], ['im', 'so', 'full', 'of',
'life', 'i', 'feel', 'appalled'], ['i', 'sit', 'here', 'to', 'write', 'i', 'start', 'to', 'dig', 'out', 'my', 'feelings', 'and', 'i', 'think', 'that',
'i', 'am', 'afraid', 'to', 'accept', 'the', 'possibility', 'that', 'he', 'might', 'not', 'make', 'it'], ['ive', 'been', 'really', 'angry', 'with',
'r', 'and', 'i', 'feel', 'like', 'an', 'idiot', 'for', 'trusting', 'him', 'in', 'the', 'first', 'place'], ['i', 'feel', 'suspicious', 'if', 'there',
'is', 'no', 'one', 'outside', 'like', 'the', 'rapture', 'has', 'happened', 'or', 'something'], ['i', 'feel', 'jealous', 'becasue', 'i', 'wanted', 'tha
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'keeps', 'telling', 'me', 'morbid', 'things', 'that', 'happened', 'to', 'his', 'dog'], ['i', 'finally', 'fell', 'asleep', 'feeling', 'angry', 'useles
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'not', 'always', 'find', 'myself', 'feeling', 'thankful', 'but', 'over', 'the', 'years', 'i', 've', 'gathered', 'a', 'few', 'tricks', 'that', 'allow',
'me', 'to', 'feel', 'grateful', 'in', 'the', 'face', 'of', 'moments', 'when', 'the', 'last', 'thing', 'i', 'want', 'to', 'do', 'is', 'say', 'thanks'],
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```


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[55]: tokenized_docs_no_stopwords = []

```

for doc in tokenized_docs_no_punctuation:
    new_term_vector = []
    for word in doc:
        if not word in stopwords.words('english'):
            new_term_vector.append(word)
    tokenized_docs_no_stopwords.append(new_term_vector)
print(tokenized_docs_no_stopwords)

```

```

[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 'start', 'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 'start', 'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trusting', 'first', 'place']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 'start', 'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trusting', 'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 'start', 'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trusting', 'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something'], ['feel', 'jealous', 'becasue', 'wanted', 'kind', 'love', 'true', 'connection', 'two', 'souls', 'wanted']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 'start', 'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trusting', 'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something'], ['feel', 'jealous', 'becasue', 'wanted', 'kind', 'love', 'true', 'connection', 'two', 'souls', 'wanted'], ['friend', 'mine', 'keeps', 'telling', 'morbid', 'things', 'happened', 'dog']]

```



```

[[ 'seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 's
'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trust
'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 's
'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trust
'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something'], ['feel', 'jealous', 'because', 'wanted
d', 'love', 'true', 'connection', 'two', 'souls', 'wanted']]
[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 's
'dig', 'feelings', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trust
'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something'], ['feel', 'jealous', 'because', 'wanted
d', 'love', 'true', 'connection', 'two', 'souls', 'wanted'], ['friend', 'mine', 'keeps', 'telling', 'morbid', 'things', 'happened', 'dog']]

```

```

[56]: porter = PorterStemmer()
wordnet = WordNetLemmatizer ()

preprocessed_docs = []

for doc in tokenized_docs_no_stopwords:
    final_doc = []
    for word in doc:
        final_doc.append(wordnet.lemmatize(word))
    preprocessed_docs.append(final_doc)
print(preprocessed_docs)

```

```

[['seriously', 'hate', 'one', 'subject', 'death', 'feel', 'reluctant', 'drop'], ['im', 'full', 'life', 'feel', 'appalled'], ['sit', 'write', 's
'dig', 'feeling', 'think', 'afraid', 'accept', 'possibility', 'might', 'make'], ['ive', 'really', 'angry', 'r', 'feel', 'like', 'idiot', 'trust
'first', 'place'], ['feel', 'suspicious', 'one', 'outside', 'like', 'rapture', 'happened', 'something'], ['feel', 'jealous', 'because', 'wanted
d', 'love', 'true', 'connection', 'two', 'soul', 'wanted'], ['friend', 'mine', 'keep', 'telling', 'morbid', 'thing', 'happened', 'dog'], ['fina
'fell', 'asleep', 'feeling', 'angry', 'useless', 'still', 'full', 'anxiety'], ['feel', 'bit', 'annoyed', 'antsy', 'good', 'way'], ['feel', 'lik
gained', 'another', 'vital', 'part', 'life', 'living'], ['feel', 'bit', 'like', 'franz', 'liebkind', 'producer', 'many', 'people', 'know', 'fuh
'terrific', 'dancer'], ['feeling', 'start', 'didn't', 'want', 'move', 'much', 'really', 'glad', 'experience', 'glimpse', 'sort', 'vibrant', 'ene
'gain', 'year'], ['bitten', 'dog'], ['always', 'find', 'feeling', 'thankful', 'year', 'gathered', 'trick', 'allow', 'feel', 'grateful', 'face',
t', 'last', 'thing', 'want', 'say', 'thanks'], ['try', 'talk', 'anyone', 'feel', 'irritable', 'like'], ['feel', 'like', 'hated', 'since'], ['do
now', 'wrote', 'following', 'little', 'note', 'feel', 'today', 'u', 'r', 'offended', 'following', 'posting', 'obviously', 'lived', 'long', 'eno
'compromised', 'act', 'believe'], ['feel', 'offended', 'choose', 'tell', 'guy', 'feel', 'treated', 'guy', 'friend', 'would', 'want', 'put', 'st
onsense'], ['remember', 'feeling', 'belong', 'smart', 'enough', 'cool', 'enough', 'even', 'young', 'enough'], ['feel', 'like', 'redeem', 'even
gh', 'think', 'realized', 'distraught', 'ok'], ['hope', 'next', 'quote', 'able', 'let', 'special', 'someone', 'know', 'im', 'feeling', 'insecur
derstand', 'matter', 'much', 'trust'], ['feel', 'much', 'better', 'without', 'help', 'ice'], ['sitting', 'typing', 'wondering', 'belong', 'feel
'distracted', 'feeling', 'comfortable', 'feeling', 'misunderstood', 'hurt'], ['still', 'feel', 'little', 'shaky', 'time', 'move', 'slightly', '
'jade', 'hair', 'particular', 'seems', 'prone', 'generally', 'work', 'well', 'spencer', 'writing'], ['stopped', 'bit', 'feeling', 'grumpy', 'm
g'], ['feeling', 'shall', 'go', 'mad'], ['happy', 'get', 'good', 'result', 'field', 'academic', 'athletics'], ['got', 'feeling', 'brig', 'sinc

```



```
[59]: doc_strings = [' '.join(doc) for doc in preprocessed_docs]
print(doc_strings)
```

```
bow_vectorizer = CountVectorizer()
bow_matrix = bow_vectorizer.fit_transform(doc_strings)

tfidf_vectorizer = TfidfVectorizer()
tfidf_matrix = tfidf_vectorizer.fit_transform(doc_strings)
```

['seriously hate one subject death feel reluctant drop', 'im full life feel appalled', 'sit write start dig feeling think afraid accept possibility might make', 'ive really angry r feel like idiot trusting first place', 'feel suspicious one outside like rapture happened something', 'feel jealous becasue wanted kind love true connection two soul wanted', 'friend mine keep telling morbid thing happened dog', 'finally fell asleep feeling angry useless still full anxiety', 'feel bit annoyed antsy good way', 'feel like regained another vital part life living', 'feel bit like franz liebkind producer many people know fuhrer terrific dancer', 'feeling start didnt want move much really glad experience glimpse sort vibrant energy gain year', 'bitten dog', 'always find feeling thankful year gathered trick allow feel grateful face moment last thing want say thanks', 'try talk anyone feel irritable like', 'feel like hated since', 'dont know wrote following little note feel today u r offended following posting obviously lived long enough compromised act believe', 'feel offended choose tell guy feel treated guy friend would want put stop nonsense', 'remember feeling belong smart enough cool enough even young enough', 'feel like redeem even though think realized distraught ok', 'hope next quote able let special someone know im feeling insecure understand matter much trust', 'feel much better without help ice', 'sitting typing wondering belong feeling distracted feeling comfortable feeling misunderstood hurt', 'still feel little shaky time move slightly odd jade hair particular seems prone generally work well spencer writing', 'stropped bit feeling grumpy missing', 'feeling shall go mad', 'happy get good result field academic athletics', 'got feeling brig sincere strong desire help others become successful financially also building strengthening relationship christianity', 'im feeling deeply overwhelmed ordinary task', 'feel grouchy irritable im sick', 'feel heart shaky time', 'expect feel content', 'feel amused absurdity', 'end getting unwanted attention boy want little ill sort starting something boy find flirting others presence ill feel really insincere around boy like', 'couldnt help feeling little bit bitter towards great big happy grin', 'go back point easy sell getting folk feel really virtuous dont want anyway', 'im feeling bit sociable although dont think ill able express everything want say', 'would feel joyful', 'certain situation felt neglected undeservedly harmed', 'felt good feel fine today', 'looked happened u two generation looked happened two three instead feeling outraged history aggression felt privileged', 'im feeling slightly optimistic', 'feel hateful hollow yes hear many smith day', 'im still feeling indecisive im polling yall p', 'sometime back another girl term exboyfriend came shout twelve midnight thought still interested boy', 'id start feeling resentful lived part country sun stubbornly refuse show end september', 'feel fucked day', 'confess feeling nervous made way event venue', 'really worried would feel intimidated monica met morning incredibly welcoming made feel relaxed straight away', 'sick cold amp feeling well wondering would even able patience go whitleys month photo shoot', 'feel like bit obnoxious picture posting', 'feel morally outraged furious often like', 'feel pissed friend didnt offer soda', 'feel heart treading dangerous territory', 'feel frightened', 'know pleasant feel selfish saying think would fallen apart', 'feel shafte d greedy', 'crappy week still feeling agitated like day wanted', 'feel rebellious particularly like watching romcoms get feeling may pretty good writing', 'feel reluctant leave alone like without helping enough repay goodness', 'ashamed feel like moment see terrified cry child dead one', 'wake morning voice throat feel ok afternoon scratchy sound like marge simpson night bad throat sore whisper', 'ive always nervous something like feel like really talented enter something official contest', 'feel bit pissed went first', 'feel satisfied knowing dirt hair longer car house', 'really like special edition really feel special song', 'would accept gift without feeling mad', 'feel hesitant since experience programming', 'feeling particularly bitchy dont think adequately expressed appreciation', 'feel confused', 'im professor look like spitball friend dying cry pillow night feel dangerous tickle jealousy luring lair', 'feel rushed finish million thing able focus task separately', 'feel tortured', 'dunno feel completely happy real world taught struggle going thru

nt full id hoped would however id taken account model beautiful long hair', 'feeling bitchy cross whatever', 'must say familiar face since go church since feeling shy wanted stay friend clingy meeting', 'never done anything make cry want cry four month feel little strange never seen side', 'feel angry led leading people believe couldnt', 'mean weve friend long time thing new right feel like ever want roll eye everything say tell obnoxious youre', 'think of ten feel way planting deeply terrified go deep ground hard get', 'lost touch thing feel passionate getting le spontaneous living list urgh', 'begun feel distressed', 'left feeling annoyed angry thinking center stupid joke', 'ever get married everything ready offer got together go club even perfect good looking guy feel intimidated talking clever self', 'feel reluctant applying want able find company know least one person', 'wanted apologize feel like heartless bitch']

```
[61]: print("\nVocabulary for Bag of Words (Bow):")
      print(bow_vectorizer.get_feature_names_out())
      print("\nVocabulary for Tf-IDF:")
      print(tfidf_vectorizer.get_feature_names_out())

      print("\nBag of Words (Bow) matrix:")
      print(bow_matrix.toarray())
      print("\nTF-IDF matrix:")
      print(tfidf_matrix.toarray())
```

Vocabulary for Bag of Words (Bow):
['aa' 'aac' 'aaron' ... 'zonisamide' 'zq' 'zumba']

Vocabulary for Tf-IDF:
['aa' 'aac' 'aaron' ... 'zonisamide' 'zq' 'zumba']

Bag of Words (Bow) matrix:
[[0 0 0 ... 0 0 0]
 [0 0 0 ... 0 0 0]
 [0 0 0 ... 0 0 0]
 ...
 [0 0 0 ... 0 0 0]
 [0 0 0 ... 0 0 0]
 [0 0 0 ... 0 0 0]]

TF-IDF matrix:
[[0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]

```
[63]: label_encoder = LabelEncoder()
y_encoded = label_encoder.fit_transform(emotions)

vectorizer = TfidfVectorizer()
X_vectorized = vectorizer.fit_transform(comment)

X_train, X_test, y_train, y_test = train_test_split(X_vectorized, y_encoded, test_size=0.2, random_state=42)

nb_model = MultinomialNB()
nb_model.fit(X_train, y_train)

svm_model = SVC(kernel='linear')
svm_model.fit(X_train, y_train)

y_pred_nb = nb_model.predict(X_test)
y_pred_svm = svm_model.predict(X_test)

print("Naive Bayes Classification Report: " )
print(classification_report(y_test, y_pred_nb, target_names=label_encoder.classes_))

print("SVM Classification Report:")
print(classification_report(y_test, y_pred_svm, target_names=label_encoder.classes_))
```

Naive Bayes Classification Report:

	precision	recall	f1-score	support
anger	0.87	0.94	0.90	392
fear	0.92	0.89	0.90	416
joy	0.91	0.88	0.90	380
accuracy			0.90	1188
macro avg	0.90	0.90	0.90	1188
weighted avg	0.90	0.90	0.90	1188

SVM Classification Report:

	precision	recall	f1-score	support
anger	0.87	0.94	0.90	392
fear	0.92	0.89	0.90	416
joy	0.91	0.88	0.90	380

accuracy			0.90	1188
macro avg	0.90	0.90	0.90	1188
weighted avg	0.90	0.90	0.90	1188

```
[65]: y_pred_nb = nb_model.predict(X_test)
nb_accuracy = accuracy_score(y_test, y_pred_nb)
print("Naive Bayes Accuracy: ", nb_accuracy)
print("Naive Bayes Classification Report:")
print(classification_report(y_test,y_pred_nb,target_names=label_encoder.classes_))

y_pred_svm = svm_model.predict(X_test)
svm_accuracy = accuracy_score(y_test,y_pred_svm)
print("SVM Accuracy: ", svm_accuracy)
print("SVM Classification Report:")
print(classification_report(y_test,y_pred_svm,target_names=label_encoder.classes_))
```

Naive Bayes Accuracy: 0.9006734006734006

Naive Bayes Classification Report:

	precision	recall	f1-score	support
anger	0.87	0.94	0.90	392
fear	0.92	0.89	0.90	416
joy	0.91	0.88	0.90	380
accuracy			0.90	1188
macro avg	0.90	0.90	0.90	1188
weighted avg	0.90	0.90	0.90	1188

SVM Accuracy: 0.936026936026936

SVM Classification Report:

	precision	recall	f1-score	support
anger	0.91	0.94	0.92	392
fear	0.97	0.91	0.94	416
joy	0.93	0.96	0.94	380
accuracy			0.94	1188
macro avg	0.94	0.94	0.94	1188
weighted avg	0.94	0.94	0.94	1188